CLAIMS

WHAT IS CLAIMED IS:

1. A variable capacitor comprising:

a housing;

a number of pairs of fixed first vanes positioned within the housing and forming a first plate of the capacitor;

a number of pairs of second vanes forming a second plate of the capacitor and mounted to rotate interdigitally between the number of pairs of fixed first vanes; and

means for circulating a dielectric fluid between the first and second pairs of vanes.

2. An apparatus comprising:

a housing including a cylindrically shaped wall portion having a longitudinal axis, the housing having a top portion and a bottom portion, the wall portion having an inner surface;

a first number of vanes fixedly attached to the inner surface, the first number of vanes being arranged to form a plurality of first vane pairs, a first vane of each first pair being respectively positioned along the inner surface of the cylindrically shaped wall portion, and the other vane of each first pair being arranged along the inner surface and positioned in a plane with the first vane;

a rotor centrally positioned within the housing and configured for rotation therewithin, the rotor including an elongated shaft which extends along the axis;

a second number of vanes fixedly attached to the elongated shaft and arranged to form a plurality of second vane pairs, the second number of vanes being separated from the first number of vanes such that a capacitance exists between the first number of vanes and the second number of vanes;

wherein vanes of each of the second vane pairs are positioned on opposite sides of the shaft and radially extend therefrom, the second vane pairs being configured to rotate interdigitally between the first vane pairs, surfaces of the first and second vane pairs being substantially parallel to and spaced apart from each other when the second vane pairs rotate, and the capacitance varying in accordance with an overlapped area of the spaced apart surfaces;

a mass of dielectric fluid substantially filling the spaces between the first and second vane pairs, thereby removing heat therefrom; and

means for circulating the dielectric fluid within the housing.

3. An apparatus according to claim 2, further comprising means for rotating the rotor.

4. An apparatus according to claim 2, further comprising electrodes positioned within the housing and electrically connected to the cylindrically shaped wall portion and the rotor.

5. An apparatus according to claim 2, further comprising bubble detecting means for detecting bubbles formed in the fluid when the gas is not removed, and for adjusting a speed of the fluid in accordance with an amount of the detected bubbles.

6. An apparatus capacitor according to claim 2, wherein each vane extends perpendicular to the longitudinal axis.

7. An apparatus according to claim 3, wherein the means for rotating is a motor.

8. An apparatus according to claim 2, wherein the fluid flows parallel to surfaces of the vanes.

9. An apparatus according to claim 2, wherein the wall portion includes:

a number of injection ports for receiving the fluid; and

a number of exhaust ports for evacuating the fluid;

wherein the number of injection ports corresponds to the number of exhaust ports;

wherein a total number of injection ports and exhaust ports corresponds to the second number of vanes; and

wherein each of the number of injection ports and exhaust ports is positioned in the vicinity of a corresponding vane of the second number of vanes.

10. An apparatus according to claim 2, wherein the fluid is a fluid dielectric.

11. A method for varying a capacitance comprising:

fixedly attaching a first number of stationary vanes fixedly to an interior wall of a housing, the first number of vanes being arranged to form a plurality of first vane pairs, first vanes of each first pair being respectively positioned along the wall, and the other vane of each first pair being positioned in a plane with the first vane;

fixedly attaching a second number of vanes to a rotor to form a plurality of second vane pairs, the rotor being centrally positioned within the housing and configured for rotation within the housing, the first number of vanes being spaced apart from the second number of vanes so that a capacitance exists between the first number of vanes and the second number of vanes;

wherein vanes of each of the second vane pairs are positioned on opposite sides of the rotor and radially extend therefrom;

rotating the rotor for interdigitally rotating the second vane pairs between the first vane pairs to cause the second vane pairs to overlap the first vanes pairs by an amount dependent on an extent of rotation in order to vary the capacitance in accordance with the amount of overlap; and

circulating a fluid within the stator, the circulating fluid thereby removing heat from the housing.

12. A method according to claim 11, wherein the fluid circulates at a predetermined flow-rate.

13. A method according to claim 12, further comprising:

means for detecting bubbles formed in the circulating fluid; and

means for increasing the flow-rate when the bubbles are detected.